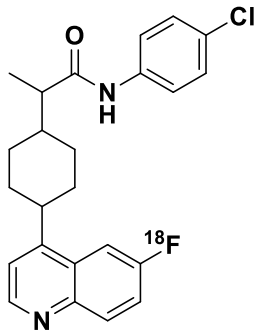
WHAT IS CLAIMED IS:

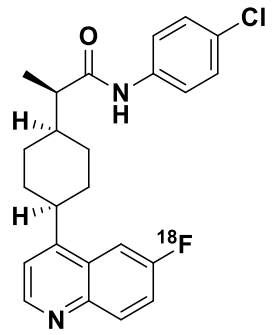
1. A radiolabeled compound having the following Formula I:



I

or a pharmaceutically acceptable salt thereof.

2. The radiolabeled compound of claim 1 having the following structure:



or a pharmaceutically acceptable salt thereof.

3. A pharmaceutical composition comprising a diagnostically effective amount of the radiolabeled compound of claim 2 and a pharmaceutically acceptable carrier therefor.

4. The radiolabeled compound of claim 2 for use in a method of *in vivo* imaging of mammalian tissues of known IDO1 expression to detect cancer cells, wherein:

(a) the radiolabeled compound of claim 2 is to be administered to a subject; and

(b) an *in vivo* image of the distribution of the radiolabeled compound is to be obtained by positron emission tomography (PET) scanning.

5. The radiolabeled compound of claim 2 for use in a method for screening a non-radiolabeled compound to determine its affinity for occupying the binding site of the IDO1 enzyme in mammalian tissue, wherein:

(a) the radiolabeled compound of claim 2 is to be administered to a subject;

(b) an *in vivo* image of tissues of known IDO1 expression is to be obtained by positron emission tomography (PET) to determine a baseline uptake of the radiolabeled compound;

(c) the non-radiolabeled compound is to be administered to said subject;

(d) a second dose of the radiolabeled compound of claim 2 is to be administered to said subject;

(e) an *in vivo* image of the distribution of the radiolabeled compound of claim 2 in tissues that express IDO1 enzymes is to be obtained;

(f) the signal from PET scan data at baseline within the tissue that expresses IDO1 is to be compared to PET scan data retrieved after the non-radiolabeled compound is administered within the tissue that expresses IDO1 enzymes.

6. The radiolabeled compound of claim 2 for use in a method for monitoring the treatment of a cancer patient who is being treated with an IDO1 inhibitor, wherein:

(a) the radiolabeled compound of claim 2 is to be administered to the patient;

(b) an image of tissues in the patient that express IDO1 enzymes by positron emission tomography (PET) is to be obtained; and

(c) to what degree said radiolabeled IDO1 inhibitor occupies the binding site of the IDO1 enzyme is to be detected.

7. The radiolabeled compound of claim 2 for use in a method for tissue imaging wherein a tissue that contains IDO1 enzymes is to be contacted with the radiolabeled compound of claim 2 and the radiolabeled compound is to be detected using positron emission tomography (PET) imaging.

8. The compound for use of claim 7 wherein the compound is to be detected *in vitro.*

9. The compound for use of claim 7 wherein the compound is to be detected *in vivo.*

10. The radiolabeled compound of claim 2 for use in a method for diagnosing the presence of a disease in a subject, wherein

(a) the radiolabeled compound of claim 2 which binds to the IDO1 enzyme associated with the presence of the disease is to be administered to a subject in need thereof; and

(b) a radio-image of at least a portion of the subject is to be obtained to detect the presence or absence of the radiolabeled compound; wherein the presence and location of the radiolabeled compound above background is indicative of the presence or absence of the disease.

11. The radiolabeled compound of claim 2 for use in a method for quantifying diseased cells or tissues in a subject, wherein

(a) the radiolabeled compound of claim 2 which binds to the IDO1 enzyme located within the diseased cells or tissues is to be administered to a subject having diseased cells or tissues; and

(b) radioactive emissions of the radiolabeled compound in the diseased cells or tissues are to be detected, wherein the level and distribution of the radioactive emissions in the diseased cells or tissues is a quantitative measure of the diseased cells or tissues.